

MISSOURI CONSERVATIONIST

VOLUME 79, ISSUE 4, APRIL 2018
SERVING NATURE & YOU



3 Things You Can Do to Help Monarchs AND Pollinators

1 Plant Natives

Native plants are a food source for monarch butterflies and other pollinators. Add these plants to your landscape:



Common milkweed



New England aster



Showy goldenrod



Prairie blazing star



Wild bergamot

2 Keep it Blooming

Keep something in bloom each season. Some species bloom all year, others only in April and May, still others in July and August. Learn more at mdc.mo.gov/monarch.

3 Get Involved

Protect native grasslands, provide nesting places, and become a wildlife gardener. To learn how, visit GrowNative.org.



Order Milkweeds & Monarchs Today!

Order this **free** publication from MDC to learn more about what you can do to help our monarchs and pollinators. Email pubstaff@mdc.mo.gov or call 573-522-0108.



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Ornate box turtle

MISSOURI CONSERVATIONIST



ON THE COVER

The Fowler's toad is one of four toad species native to Missouri.

by JIM RATHERT

35mm lens, f/14, 1/60 sec

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Inbox



Letters to the Editor

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MISSOURI
CONSERVATIONIST
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SUPERB MAGAZINE

Just a note to tell you how great the *Missouri Conservationist* is. It is a superb magazine. I commend Sara Parker Pauley for her leadership.

Richard Klapp
St. Charles

SCREECH-OWLS

I always enjoy your magazine, but the February issue was outstanding. The article on screech-owls [*The Eastern Screech-Owl*, Page 16] brought back memories from 40 years ago. We lived in a reclaimed farmhouse that was thick with mice, so we kept traps set and usually caught some every night.

There was an old shed where we kept a lawn mower and hand tools. One morning I went out there and came face to face with a screech-owl. She was perched on the top of the wall and did not appear to be frightened by me. I went back to check our traps and we had a couple. I took them to our owl. For the rest of the summer, I would take her a mouse. She would stand on one leg, reach out with the other, and take them out of my fingers. We enjoyed having her around. Thanks for bringing back pleasant memories.

Ray Bozarth via email

My family subscribes to conservation magazines from both Missouri and Kansas, and frankly, we like yours the best. I have been a photographer for many years, and the quality of the shots in your publication are superior to others. I wish to congratulate Angie Morfeld for the splendid article on the eastern screech-owls that we've all read many times.

Steve Stalker Kansas City, Kansas

I can relate to the *Up Front* story about the call of the barred owl [February, Page 3]. The first time I heard it was just a few years ago at Ha Ha Tonka State Park's owl call night. There were several of us there at the old post office gazebo. We must have called in several owls because it got quite loud. You're right, it sounds like monkeys in the trees! I'll never forget it!

Donna Jablonski Osage Beach

OH DEER!

Thanks for the article *Oh Deer, Some Bunny Ate My Veggies* in the February issue [Page 22], just in time for garden planning. After several years of deer problems, a local conservation agent helped me with ideas for my deer fence. Last year my garden was pest free.

Cammy Marble Lone Jack

I read with interest the fencing method to keep out deer. I don't grow vegetables, but do have numerous shrubs and flowers that deer were devouring. Fortunately, I came across a solution in a gardening magazine that demonstrated using VHS tapes. Sometimes I use green garden stakes and stretch the tape across, but more often I just drape the tape loosely on the plant, bush, or tree.

Margaret Gustafson St. Louis County

MORE LOVE FOR THE CONSERVATIONIST

I was gifted this subscription when I moved out of Missouri to Wisconsin. I have since moved to Denver, but still receive the magazine. I enjoy keeping up with Missouri conservation and love hearing all the great work being done.

Brandon Gutteridge Denver, Colorado

I am writing to let you know how meaningful and enjoyable your magazine has been for us over the years. Recently, it has had a profoundly positive impact on a relative who lives in a community home. When I introduced him to your magazine, he seemed intrigued. Clearly the photos captivated him. In addition, one feature attracted his attention and prompted him to reach for your magazine, uncharacteristically, on his own — the *What Is It?* feature. It is delightful to see him enjoy your wonderful magazine. Thank you!

Louise Cheli St. Charles

The *Conservationist* is a collection of nature's art. The images captured are so beautiful that I find it difficult to discard old issues. I still find it difficult to believe the exceptional collection of work and art that each edition offers.

Charles Cornelius Kansas City

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Want to see your photos in the Missouri Conservationist?

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email Readerphoto@mdc.mo.gov,
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on your Instagram photos.



1

1 | Bluebells in
woodland by
Mike Conley,
via Flickr

2 | Trout catch by
[mrs_ketch231](#),
via Instagram

3 | American
Avocet by [Rachel
Becker](#), via email



2



3

MISSOURI CONSERVATION COMMISSIONERS



Don
Bedell



Marilynn
Bradford



David
Murphy



Up Front

with Sara Parker Pauley

✕ One of my most treasured possessions is a hand-stitched quilt a dear childhood friend made for me before I went off to college. I always felt awed by this beautiful gift that required such commitment of time and talent. This quilt came to my mind not long ago. It had been a long week of meetings and hearings, and I still had talks to give both Friday night and Saturday. As I arrived in St. Louis for an event with the Gateway Trout Unlimited Chapter, I looked at my notes, wondering how I might inspire those in attendance.

But as I began meeting the volunteers of the 800-member chapter of Trout Unlimited (TU), I heard a collection of marvelous stories, each one truly inspirational. Some were motivated to connect with school-aged children through classroom programs about trout and water quality. Others were motivated to get folks fishing, including wounded veterans. Some members found their passion restoring their favorite stretch of Missouri's wild trout waters, while others focused on bringing like-minded conservationists together. When the time came to give my remarks, I found myself more energized and inspired than I had been in a long time. Here I thought I was coming to inspire and instead the gift was given me.

Much like my prized quilt, the stitching together of individual passions, talents, and commitment to continue our legacy of conservation in Missouri filled me with awe. You will read about other inspiring community-based conservationists on Page 16. I know there are similar stories to be found all around the Show-Me State. I can't wait to discover them, to be awed and inspired by the conservation efforts each one is making.

Sara Parker Pauley

SARA PARKER PAULEY, DIRECTOR
SARA.PAULEY@MDC.MO.GOV

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Printed with soy ink



mdc.mo.gov 3

Nature LAB

by Bonnie Chasteen

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

RESOURCE SCIENCE

Light Detection and Ranging (LiDAR)

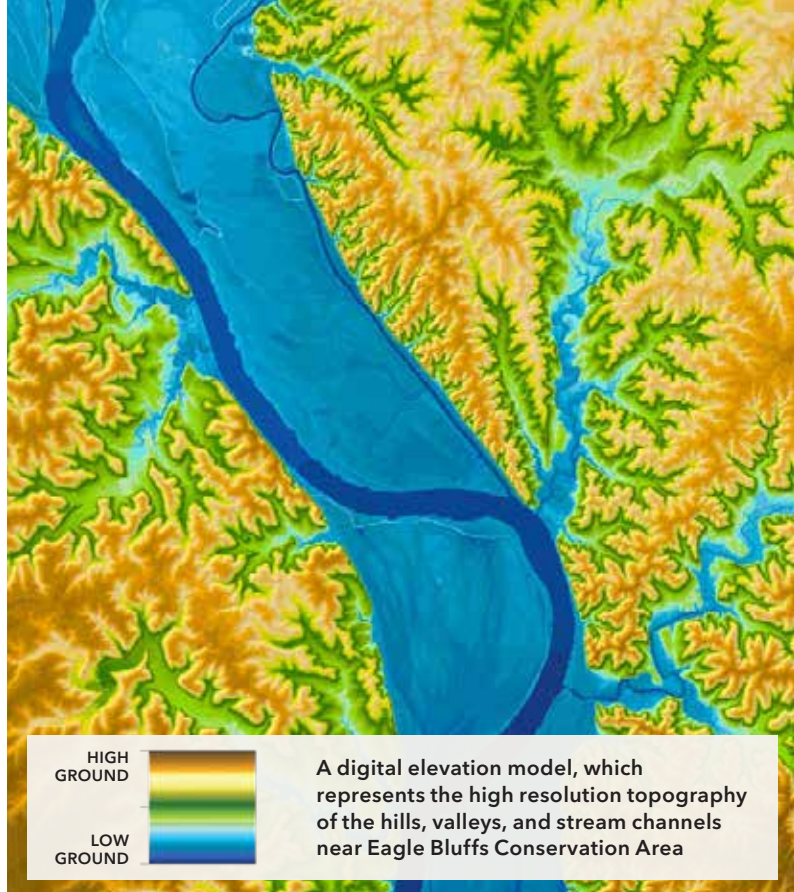
✳ In February, *Smithsonian* magazine revealed that researchers using laser-mapping technology had discovered more than 60,000 Mayan structures in the Guatemalan jungle.

Turns out laser-mapping, also known as light detection and ranging (LiDAR), can help MDC researchers and biologists detect hidden clues about land and waterways here in Missouri.

For example, Resource Scientist Frank Nelson and other wetland biologists use LiDAR imagery to plan wetland restoration projects.

“LiDAR maps helped us better understand chronic challenges with flooding around Schell-Osage Conservation Area. We were able to see higher and dryer ridges, along with low spots where water might flow during the next flood. This enhanced view helped us evaluate potential solutions.”

Once costly, LiDAR has evolved over the last 10–15 years, becoming more affordable and more available across the state. Currently, it allows users to look at and through vegetation to the ground below.



Technology reveals contours, historic changes, and hidden features, helping managers plan and prioritize projects

Foresters can calculate fuel loads and timber stand structure. Hydrologists can detect conditions and issues in a watershed. Ecologists can use LiDAR maps to determine certain natural communities and the location of different landforms, which help identify where restoration efforts are most likely to succeed.

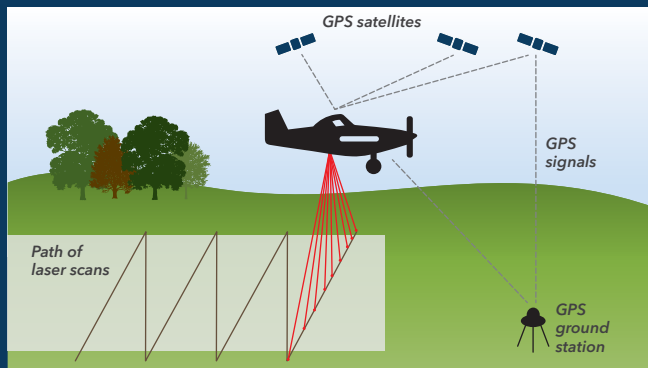
For wetland work, LiDAR is a useful tool to estimate water depths and acres of flooded habitats. “It provides a sharable record, and it helps flatten the learning curve,” Nelson said.

It also makes collaboration between agencies more effective. “LiDAR provides another data set agencies can use to make better decisions with taxpayer dollars,” Nelson said.

LiDAR at a Glance

How it Works

A pulsed laser sensor attached to a plane detects surface features, allowing the instrument to build complex maps.



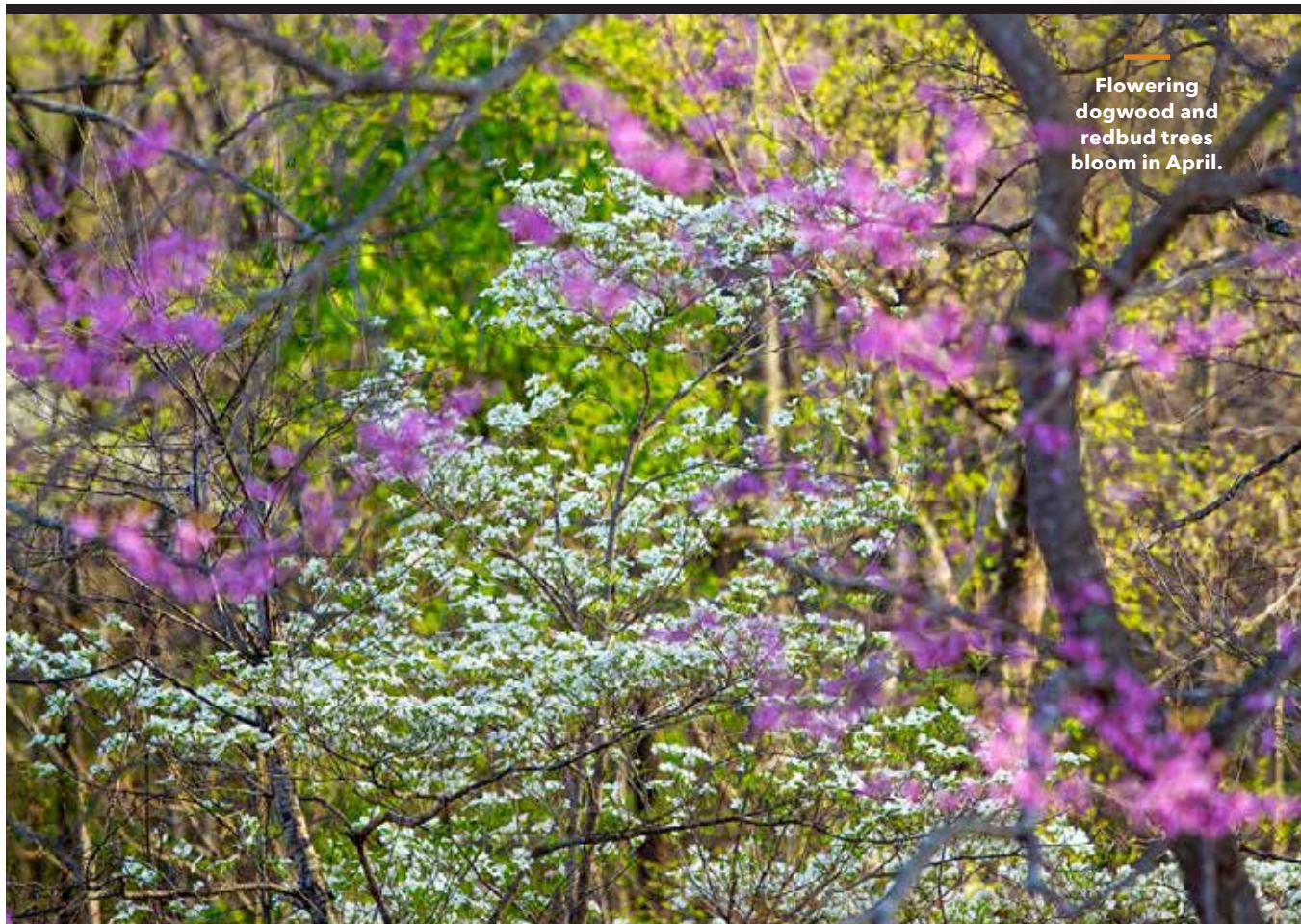
Key Missouri GIS/LiDAR Partners

These and other partners have been working to collect LiDAR images of every county in Missouri.

- ✳ Natural Resources Conservation Service
- ✳ U.S. Geological Survey
- ✳ U.S. Army Corps of Engineers

In Brief

News and updates from MDC



Flowering dogwood and redbud trees bloom in April.

CELEBRATE TREES DURING ARBOR DAYS

MISSOURI ARBOR DAY IS FRIDAY, APRIL 6

➔ To celebrate the value of our trees and forests, plant native trees and practice proper tree care during Arbor Days in April.

MDC's George O. White State Forest Nursery near Licking offers Missouri residents a variety of low-cost native tree and shrub seedlings for reforestation, windbreaks, erosion control, and wildlife food and cover. Orders are accepted from Nov. 1 to April 15 every year. For more information, visit mdc.mo.gov/seedlings.

For information on backyard tree care, including types of trees for urban and other landscapes, selecting the right tree for the right place, planting tips, watering and pruning, and more, visit mdc.mo.gov/tree-health.

Missouri has observed the first Friday in April as the state's official Arbor Day since 1886 when the General Assembly declared that day be set aside for the appreciation and planting of trees. National Arbor Day is recognized on the last Friday of April, which is April 27.

Communities across the state hold local Arbor Day activities. For more information on Arbor Day and Missouri's Tree City USA communities, visit the Arbor Day Foundation at arborday.org.

Did You Know? Missouri forests cover about one-third of the state and provide outdoor recreation, wildlife habitat, natural beauty, and watersheds for streams and rivers. Missouri forests also provide employment for more than 44,000 people who convert trees into essential products. For more information, visit mdc.mo.gov/forest.

FREE LOANER FISHING GEAR

Want to fish but don't have the gear? MDC can help through the free Rod and Reel Loaner Program. Find one near you at more than 100 locations around the state including libraries, MDC offices and nature centers, some state parks, and several marinas.

In addition to offering a rod with a standard spin-cast reel, the program also provides a small tackle box with hooks, sinkers, bobbers, and a stringer to hold your catch. Anglers need to bring their own live bait or lures.

MDC started the program in 2014 and now offers more than 4,000 sets of fishing gear. Congratulations to The Mid-Continent Public Library in Smithville, which recently became the program's 100th loaner location.

"Most communities have a local library and people are generally familiar with going to a library to check out books, DVDs, CDs, and other items," MDC Fisheries Program Specialist Andrew Branson said. "Now they can also borrow fishing equipment as simply as checking out a book."

For a list of MDC Rod and Reel Loaner locations, visit mdc.mo.gov/RodandReelLoanerProgram.

MDC offers free fishing lessons, too

To help people get hooked on fishing, we offer the Discover Nature — Fishing program from May to September at numerous locations around Missouri. The free four-lesson series is for families and youth ages 7-15.

Discover Nature — Fishing lessons are taught by experienced anglers and cover equipment, casting, proper fish handling, tying hooks, stocking a tackle box, fish identification, how to release a fish, regulations, and other topics. For more information, visit mdc.mo.gov/DiscoverNatureFishing.

For more information on fishing in Missouri, including public places to fish, regulations, seasons, what to catch, fishing tips, and more, visit mdc.mo.gov/fishing.

WILD WEBCAST ON ATTRACTING BACKYARD WILDLIFE

The next MDC Wild Webcast: Attracting Backyard Wildlife is scheduled for May 16 from noon to 1 p.m. Join MDC State Ornithologist Sarah Kendrick, Community Conservationist for the City of Columbia Danielle Fox, and MDC Habitat Management Coordinator Nate Muenks as they discuss attracting birds and other wildlife to backyards through bird feeding, native plantings for wildlife food and shelter, and other habitat help. Register at short.mdc.mo.gov/ZTh.

Watch previous MDC Wild Webcasts at short.mdc.mo.gov/ZwE to learn about invasive species, mountain lions, birding, fishing, chronic wasting disease, black bears, pollinators, and feral hogs.

Ask MDC

Got a Question for Ask MDC?

Send it to AskMDC@mdc.mo.gov
or call 573-522-4115, ext. 3848.

Q: I caught this in Boeuf Creek in Franklin County. What kind of fish is it?

➔ This is a striped shiner. This silvery minnow has a broad, dark stripe along the midline of its back and faint parallel lines that converge behind the dorsal fin, forming V-shaped markings. Adults tend to be 3-5 inches long. Males can be quite colorful during breeding season, with a pink flush on body and fins. They will also have black crescent-shaped markings on their sides and many small hard bumps on their head, called nuptial tubercles.

Striped shiners prefer clear, permanent-flowing streams with clean gravelly or rocky bottoms. They like relatively warm and quiet water and are less tolerant of turbidity than their close relative, the common shiner.



Striped shiner

These fish formerly were found as far north as the Iowa border. Today, they are more commonly found in Ozark streams in south Missouri, but not the Bootheel. They spawn from late April to mid-June and often use the gravel nests of the hornyhead chub, a fish known for constructing gravel mounds 1-3 feet in diameter that are guarded by a single male.

Q: What would cause a white-tailed buck to still have antlers in April?

➔ Sometime toward the end of breeding season — usually from the end of December to mid-February — a buck's antlers become loosened around the base by reabsorption of the bone. This is commonly called casting or shedding.

The shedding of antlers is the result of a decrease in testosterone and potentially declining body condition due to the stress of the rut. Bucks that are still in good condition, post rut, tend to carry their antlers longer than bucks in poor condition.

So perhaps that is what has happened here. Another possible explanation is that unbred does in the area continued to stimulate testosterone production in the buck, delaying the shedding process.

Normally, antlers begin growing about this time of year. Longer hours of daylight in spring stimulate the pituitary gland to initiate antler growth. Rapid growth starts in April or May when the base (the pedicle) is covered with soft skin richly supplied with blood vessels. The blood transports the calcium, phosphorus, protein, and other materials from which the antlers are made.

Q: What tree grows thorns like this? I noticed them while visiting Walnut Woods Conservation Area?

➔ This species is a honey locust (*Gleditsia triacanthos*), a medium-sized tree with a short, thorny trunk, thorny branches, and a loose, open crown.

Thornless varieties of honey locusts are useful plants, since they are tolerant of urban conditions and make excellent shade trees. The hard and durable wood can be used for a variety of products, including fence posts and



Honey locust

furniture. The legume pods are an important food for wildlife.

Although it was mostly a bottomland tree originally, it is invasive in a variety of upland habitats, especially prairies.

The thorns have been used as needles, weapons, and for carding wool.

AGENT ADVICE

from

Lucas McClamroch

BOONE COUNTY
CONSERVATION AGENT

If a case of spring fever has you hearing the call of the wild — or the gobble of the wild — you are in luck! Spring turkey season opens April 16 and runs through May 6. Get your permit now. Use the MO Hunting app, call 800-392-4115, buy from your local vendor, or buy online at **mdc.mo.gov/permits**.

Dress defensively — wear hunter orange, especially when moving afield. Never wear red, white, blue, or colors that resemble those of a turkey. Sit against a tree or other natural barrier. Always identify your target before pulling the trigger and be aware of what lies beyond it. If

you take your time and are safe, you will have an enjoyable season.



What IS it?

Can you guess this month's natural wonder?

The answer is on
Page 9.



**INVASIVE
SPECIES**

BRADFORD PEAR

Invasive nonnative plants consume wildlife habitat and pasturelands, and compete with crops. Do what you can to control invasive species when you landscape, farm, hunt, fish, camp, or explore nature.

What Is It?

Also known as Callery pear, Bradford pear (*Pyrus calleryana*) is a compact tree that produces abundant clusters of white flowers in the spring and bears greenish-yellow, flecked, apple-like fruit. It can grow 30–50 feet tall.

Where Is It?

You can find it statewide in urban, suburban, and rural yards, office and apartment complexes, malls, streets, and college campuses. However, this pear is now escaping to and overtaking disturbed areas, roadsides, pastures, and natural landscapes.

Why It's Bad

"A single wild tree can produce and spread a tremendous amount of seeds, dispersed primarily by birds, to establish new populations, often forming dense, impenetrable thickets and outcompeting native plants," said Nate Muenks, habitat management coordinator.

How to Control It

In areas with light infestation, pull small trees by hand when the soil is moist, taking care to remove the entire root. In dense stands, spray with a herbicide solution in mid- to late summer. Cut down medium to large trees and treat stumps immediately with herbicide to prevent resprouting. Alternatively, treat the lower 12 inches of bark around the entire trunk with the appropriate herbicide.



Small trees are easy to cut with hand tools. Treat stumps with herbicide immediately to prevent resprouting.



For more information, visit short.mdc.mo.gov/ZTA



Clusters of white flowers look pretty but smell terrible.



Branches have sharp thorns.



Dense thickets crowd out native plants and wildlife.

FIRST LEOPOLD AWARD GIVEN

Congratulations to Matt and Kate Lambert, who recently received the first Missouri Leopold Conservation Award for conservation efforts on their north-central Missouri farms.

Given in honor of renowned conservationist Aldo Leopold, the award recognizes farmers, ranchers, and other private landowners as leaders in conservation. In his influential, posthumous 1949 book, *A Sand County Almanac*, Leopold called for an ethical relationship, which he deemed "an evolutionary possibility and an ecological necessity," between people and the land they own and manage. The Lamberts, who own Uptown Farms, received the award for extensive and varied use of soil and water conservation efforts, such as no-till planting and cover crops on their row crops and grazing rotations for livestock on their 2,000 acres.

The Lamberts also protect their waterways by keeping their cattle and sheep out of sensitive areas and using terrace systems to help manage, protect, and clean the water leaving their farm.

They also manage nearly 450 acres of native grass under the Conservation Reserve Program that increase habitat for deer, turkey, small game, and pollinators.

More than 90 percent of land in Missouri is privately owned, and MDC works with tens of thousands of Missouri landowners to implement sound conservation practices. Learn more at mdc.mo.gov/property.

For more information about the Sand County Foundation's Leopold Award, visit sandcountyfoundation.org/our-work/leopold-conservation-award-program.



MDC Director Sara Parker Pauley presents the Leopold Conservation Award to Kate Lambert of Uptown Farms at the 2018 Missouri Natural Resources Conference at the Lake of the Ozarks. Pictured left to right: Dr. Stanley A. Temple, Beers-Bascom professor emeritus in conservation at the University of Wisconsin-Madison and Sand County Foundation board member; Colleen Meredith, Missouri Department of Natural Resources Soil and Water Conservation Program director; Karen Brinkman, assistant state conservationist at USDA-NRCS Missouri; Kate Lambert, co-owner and operator of Uptown Farms; MDC Director Sara Parker Pauley; Ashley McCarty, executive director, Missouri Farmers Care; Lance Irving, national program director, Sand County Foundation.

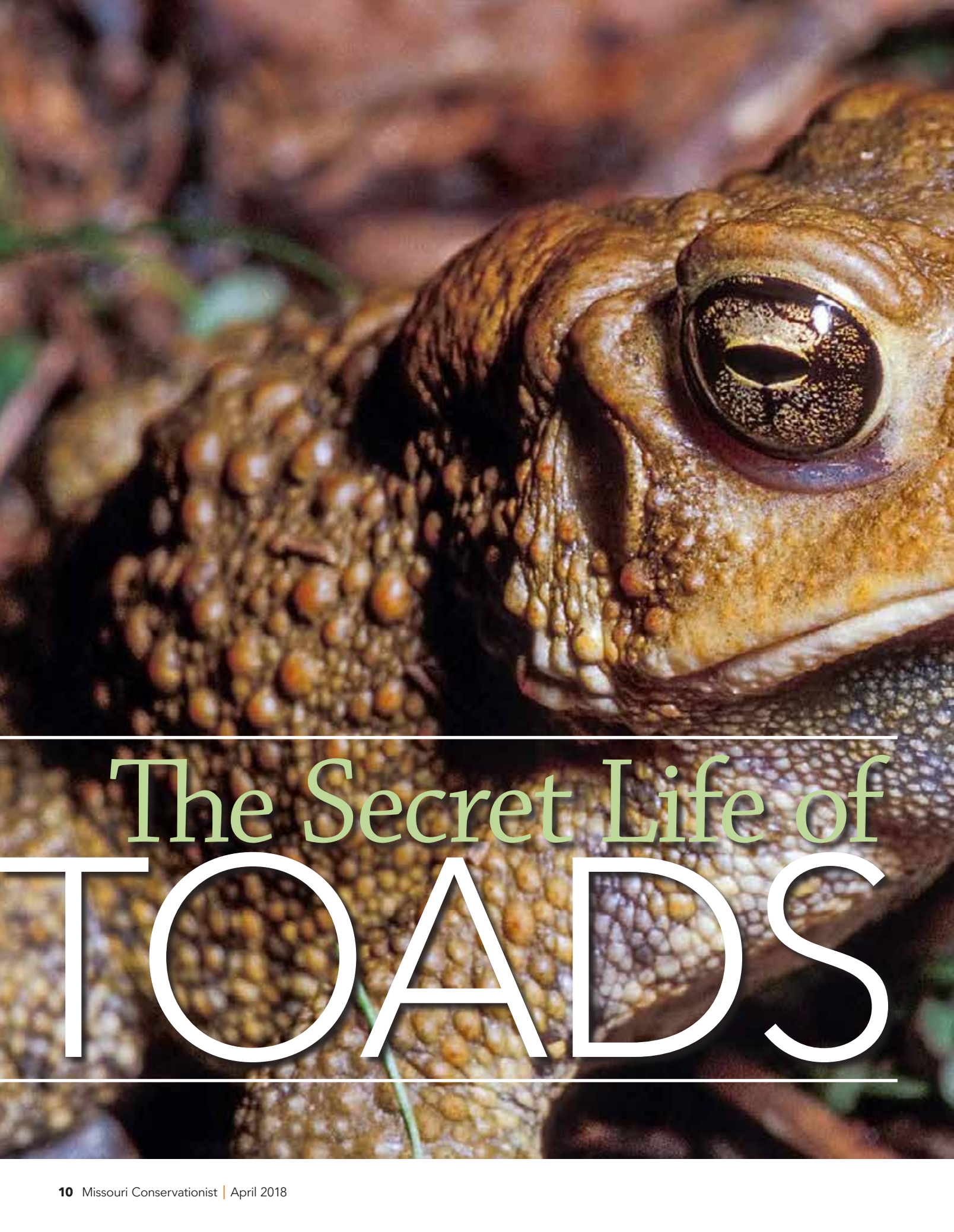
What IS it?

GOLF BALL SEDGE

Commonly known as golf ball sedge because of the spiky round balls dotting the long, grasslike green leaves, *Carex grayii* bloom from May through October. The fruits remain on the plant in winter, adding an interesting accent when the shadows reflect on snow. This sedge thrives in moist soil and is best when used in large groups around pools and ponds. It also makes an interesting accent plant when grown near water gardens or even in containers.

Photograph by Jim Rathert





The Secret Life of TOADS



American toad

PHOTOGRAPH BY
JIM RATHERT

THERE'S A LOT MORE TO THESE SHY, FABLED CREATURES THAN MEETS THE EYE

by Jan Wiese-Fales

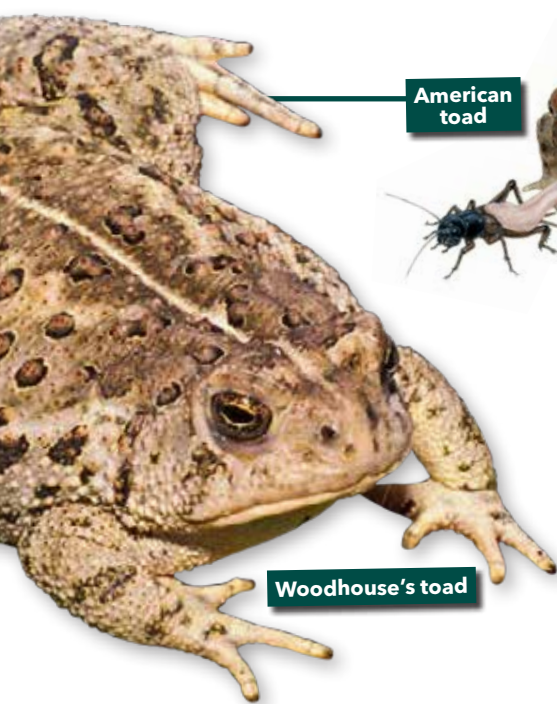


Fowler's toad

While you might be excited to encounter a toad in your yard or the Missouri wilds, some people find the small, warty creatures to be a little creepy. In a number of primitive cultures, toads were considered magical. The mild-mannered amphibians featured prominently in South, North, and Meso-American Natives' creation myths as a beast that succeeded where others failed — in some cases as a frightening, formidable force. In Asian mythology, toads held the secret to immortality, and Europeans in the Middle Ages associated the golden-eyed hoppers with witches and witchcraft.

THE TRUTH ABOUT TOADS

According to the National Wildlife Federation, 580 species of toads inhabit every continent but Antarctica, and of the 22 species native to the United States, four make themselves at home in Missouri. Before 2006, when scientists reordered their classification, the state's four toad species were included in the genus *Bufo*, but now scientists classify them in the genus *Anaxyrus*, though this remains controversial with some herpetologists, or scientists who specialize in the study of reptiles and amphibians.



American toad

Woodhouse's toad

HARMLESS TO HUMANS, TOXIC TO PREDATORS

During the day, toads are inactive and burrow underground in sand or soil, also hiding under organic litter, bark, partially buried logs, and rocks. They become active in the evening and during rains. This lack of daytime activity and their color camouflage are two of the toad's defense mechanisms, along with their ability to puff themselves up to look more fearsome in the eyes of a predator. Toads also have a secret weapon that protects these otherwise harmless creatures from becoming another animal's meal.

Kidney-shaped paratoid glands located behind toads' eyes secrete a moderately potent toxin known as bufotoxin. The milky substance irritates the mucous membranes in predators' mouths and can even cause death if an animal chooses to ignore the irritation and swallows the toad.

Contrary to popular folklore, toads do not cause warts, but because of bufotoxins, it's a good idea to wash your hands after touching or holding a toad.

"Many mammals won't eat them," Briggler said. "But raccoons can devastate toad populations when the toads are out calling at night. A raccoon will eat everything but the head, avoiding the bad-tasting paratoid glands, and can consume up to 20 or 30 toads in a night."

Briggler said toads also are a favorite food of hog-nosed snakes. A few other snake species, herons, and hawks also are known to prey on toads.

FRIENDS OF FARMERS AND GARDENERS

Toads' meal preferences include mosquitoes, ants, spiders, beetles, crickets, and locusts, as well as snails, cutworms, and earthworms — 10,000 or more in one season — making them great allies of farmers and gardeners.

Toads do not have teeth and must swallow prey whole. But toads' tongues are attached in the front of their mouths where they are of no use in swallowing. This problem is solved by toads blinking their eyes when they snag a meal, which causes their eyeballs to roll into the roof of their mouth, pushing their prey into their throat, a characteristic shared with frogs.

Male toads woo potential mates with a long musical trill generated from an inflated vocal sac. They can sing alone, but in most cases large choruses can be heard at night. On occasion, they have been known to romance toads of other species. Although males are the most vocal, Briggler said even some female toads make chirping sounds when handled.

"Each of the species has a different calling time frame," he said. "We train volunteers to record calling activities throughout the state. Some toads are restricted to specific parts of the state while others are statewide, and we collect information on population and distribution trends of these species along defined routes."

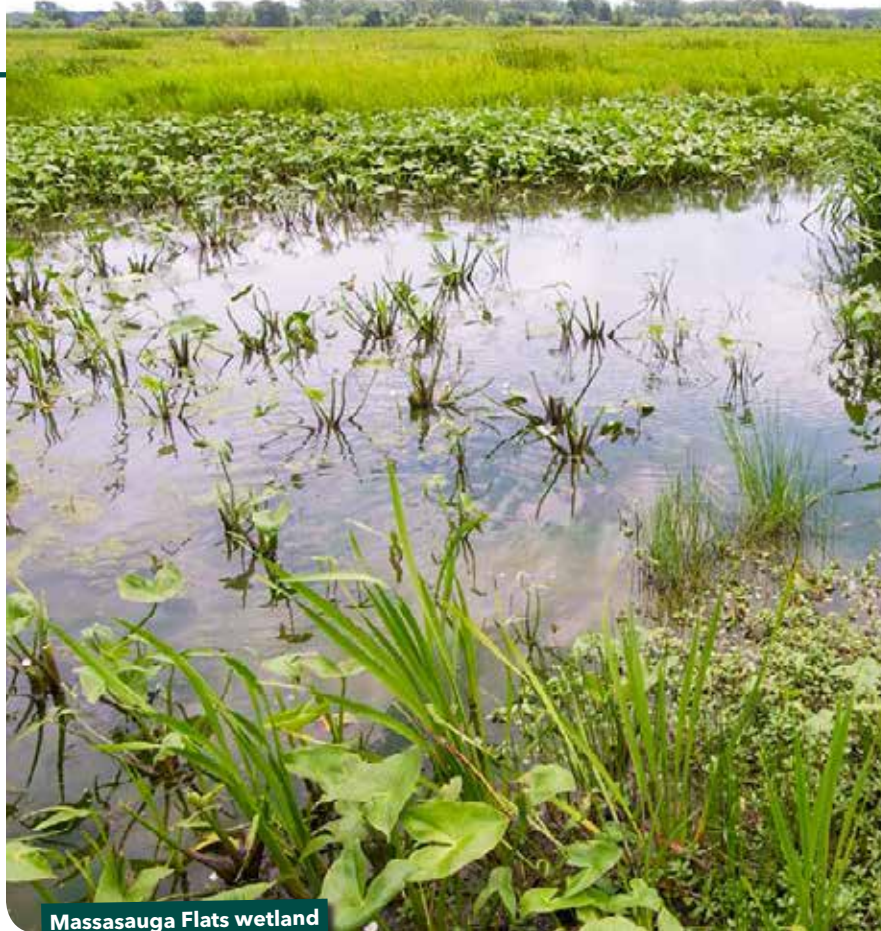


Fowler's toad

A toad's paratoid gland secretes bufotoxin, which helps deter predators.



Great plains toad



Massasauga Flats wetland

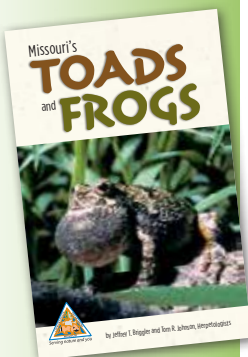


American toad eggs



American toad tadpole

Missouri's toads are harmless, vocal, and valuable. Order this free publication from MDC to learn more about these unique creatures. Email pubstaff@mdc.mo.gov or call 573-522-0108.



THEY NEED WETLAND HABITAT TO BREED

The American toad can be found state-wide, with one subspecies, *A. a. americanus*, inhabiting northern Missouri, and a second dwarf species living predominately in the southern half of the state. Both Fowler's and Woodhouse's toads typically prefer floodplain areas. Their habitats overlap to some extent, and it can often be difficult to distinguish between these two species. However, Briggler said Fowler's toads prefer more upland habitat, especially in the Ozark Highlands.

"In Missouri, the Great Plains toad is found only in the Missouri River floodplain from Jefferson City to extreme northwestern corner and is a fairly rare species. We spend more time surveying for them to determine population status and distribution in the state. They are a species of conservation concern, due to limited distribution and habitat loss, but appear to be doing well in Missouri at this time," Briggler said. "The biggest threat to Missouri toads is loss of habitat, especially temporary wetlands necessary for breeding.

"Toads breed and lay their eggs in wetlands, places like farm ponds, temporary pools, ditches, sewage lagoons, rain gardens, little creeks, and garden ponds," he said. "They reach sexual maturity in two to three years with males reaching reproductive age before females."

A female toad lays between 2,000 and 20,000 eggs. And unlike many frogs, which deposit their eggs singly or in masses, toads lay eggs in long strings. Most eggs hatch within a week, and the tiny, black tadpoles develop into toads that are ready to hop onto dry land in six to eight weeks.

"As with many species, there are good reproductive years and bad reproductive years for toads, dictated by weather conditions," Briggler said. "When a ditch where eggs are laid dries up too quickly, the tadpoles die, but in wet years, many tadpoles survive to move onto land as tiny toads. Even though toads are known to lay thousands of eggs, typically less than 1 percent reach adulthood."



American toad

FUN TO OBSERVE, IMPORTANT TO CONSERVE

In addition to answering questions and tracking amphibian populations, one of the state herpetologist's duties is to inform people of Missouri's regulations as they pertain to the collection and possession of amphibians and their eggs.

"If you are a Missouri resident, you can have up to five toads in your possession. We want people to be able to possess a few individuals in order to learn about their interesting behaviors, but at the same time to conserve natural populations in the wild," Briggler said.

For those who want to watch tadpoles develop into toads, Briggler suggests feeding them a diet of cooked lettuce and spinach to keep them healthy as they develop.

"Personally, I encourage kids to keep a toad or two that they catch for a few days and then let them go where they captured them," Briggler said. "Also, remember that toads, like many other small animals, are fragile and can often be squeezed too hard.

"Toads are popular as pets. They are small and relatively easy to maintain. But if you decide to have a toad as a pet, you should not feed it a one-item diet, like purchased worms or crickets. Feed items like grasshoppers, crickets, worms, and other bugs in the yard to build up the nutritional value of their diets," Briggler said.

Toad lifespans range from five to 12 years in the wild, but there are instances of toads living much longer in captivity.

"There's a great fascination with toads," Briggler said, acknowledging that part of their popularity is in response to the fact that they are easy to observe.



Woodhouse's toad

"They were made for land and don't move too quickly. Some people grow accustomed to seeing that little toad sitting there in the same spot every day." ▲

Jan Wiese-Fales is a freelance writer who lives in Howard County and enjoys camping, hiking, floating, and photographing in Missouri's spectacular wild outdoors.



American toad



WOODHOUSE'S TOAD: JIM RATHER; AMERICAN TOAD: JEFFREY T. BRIGGLER; GIRL WITH TOAD: NOPPADOL PAOTHONG

A GUIDE TO MISSOURI'S TOADS

American toad (*Anaxyrus americanus americanus*)

Missouri range: Exists throughout the state; prefers rocky, wooded areas at forest edges

Size: 2 to 3 inches; females typically larger than males

Identifying characteristics

- Gray, light brown, or reddish-brown
- Dark spots on back may encircle from one to three warts
- Belly is cream-colored and mottled with dark gray

Sound: High-pitched musical trill lasting six to 30 seconds

Breeding: Late March, April, and early May



Fowler's toad (*Anaxyrus fowleri*)

Missouri range: Found along many Ozark streams in most eastern and southern parts of the state on gravel bars and in sandy soil

Size: 2.5 to 4 inches

Identifying characteristics

- Gray, tan, brown, or greenish-gray color with paired dark markings, each with three or more warts
- Often a thin, white stripe down the back
- Belly is cream-colored
- May be a dark gray spot on the chest

Sound: Short nasal "w-a-a-a-h" lasting from one to 2.5 seconds

Breeding: Late April to early June



Great Plains toad (*Anaxyrus cognatus*)

Missouri range: Floodplain of the Missouri River from central Missouri to the northwestern corner of the state; rare

Size: 2 to 3 inches; females larger than males

Identifying characteristics

- Skin covered with many small warts
- Large, dark brown, or green, paired blotches encircled by contrasting white or tan lines
- Cream-colored belly
- Exhibits a raised hump (known as a boss) between its eyes

Sound: Loud, rapid piercing, metallic, chugging "chee-ga, chee-ga, chee-ga" that lasts 20-50 seconds

Breeding: Mid-March to early June



Woodhouse's toad (*Anaxyrus woodhousii*)

Missouri range: Mainly along the Missouri River floodplain and along streams in the western part of the state

Size: 2.5 to 4 inches, occasionally larger

Identifying characteristics

- Extremely variable — gray, greenish-gray, and tannish-gray to brown
- Irregular dark markings with the number of warts in each varying from one to six
- White stripe often present down back
- White belly

Sound: Short, nasal "w-a-a-ah" lasting from one to 2.5 seconds

Breeding: April to June





Native plants and other natural features of the demonstration and learning garden at Brightside St. Louis are examples of the way more cities are combining conservation with community design.



Conservation *Goes to Town*

BUILDING WITH NATURE IS BECOMING AN IMPORTANT PART OF URBAN PLANNING

by Francis Skalicky | photographs by Noppadol Paothong



It's 5:15 p.m. on a Wednesday, and Springfield's Martin Luther King Jr. Bridge depicts a tale of two cities.

The pulsating swoosh of vehicles passing across the bridge is the tempo of an urban rush hour going smoothly. It's an auditory narrative of a thriving midtown economy.

Beneath the bridge, a different story of city life is portrayed. Here, the bridge supports trees, not traffic. Users of the greenways trail that passes beneath the bridge can get a wealth of forest facts from a Tree City USA mural that adorns the bridge's abutments. The artwork,

which is a cooperative effort of civic and state organizations, has information on the functions and features of trees growing in and around Springfield. Adjacent to the bridge — and, no doubt, garnering newfound respect each time a passerby reads the mural — is an array of trees planted along the trail.

A concrete underbelly of a downtown bridge may seem like an unusual place to read about natural resource stewardship, but using routes to talk about roots is one example of how a growing number of resource experts, architects, developers, city planners, and residents are making conservation a part of life in the city. Communities across the state

are realizing the same conservation practices that help the state's forests, prairies, and streams thrive also have a place in urban areas.

Conservation Heads Uptown and All Over Town

"Today we are learning how to interweave nature throughout our cities," said Ronda Burnett, a community conservation planner for the Missouri Department of Conservation in Springfield. "Community conservation matters to the citizens of Missouri because it is a way to preserve our sense of place and our cultural heritage. It helps us to understand the natural world in which we live and to connect to nature in ways that make us healthy and happier."

The Martin Luther King Jr. Bridge's tree information is an example of promoting resource stewardship in an urban setting, but community conservation consists of more than informational signage and decorative plantings. Incorporating natural features and native habitats into a site's design through the use of vegetated swales (small depression planted with native plants), rain gardens, green roofs, tree shelter belts, wetlands, pervious (porous) pavement, and other low-impact development (LID) practices can provide economic and safety advantages as well as conservation benefits. Statewide examples show how.

In Springfield, a system of microdetention basins (wide, shallow, vegetated basins) on the grounds of the Brentwood Library improves water quality by



MDC's Ronda Burnett, left, and Carrie Lamb, City of Springfield, inspect a bioswale planted with prairie dropseed at Springfield's Government Plaza. Native plantings are part of the site's conservation-oriented design.

Monarch butterfly on New England aster





filtering out pollutants carried in runoff from the roof and parking lot. It also benefits nearby drivers and residents by reducing the amount of water that drains onto adjacent streets following heavy rains.

At the corporate headquarters of Alberici Constructors Inc., a construction firm based in St. Louis, extensive use of native plants on the site eliminates the need for an irrigation system. A catchment system consisting of two retention ponds collects rainwater from the garage roof area. This rainwater is stored in a cistern, treated, and then used for sewage conveyance, saving nearly 150,000 gallons per year. The site's constructed wetland and prairie-style landscaping has kept paving to a minimum and has reduced the "heat island" factor. Heat islands form in urban areas where large paved areas absorb and retain heat from the sun. These areas increase energy costs and contribute to heat-related illnesses.

Helping Humans and Habitats

"Community conservation practices are becoming more common in cities because they are now better understood and viewed as viable options for achieving project goals," Burnett said. "The marketplace is supplying the products needed for these practices and the incentives, via green certification programs, to construct them. Professionals are now trained to design and specify these practices, and facility and



From left to right, MDC Community Forester Mark Grueber, MDC Community Conservation Planner Josh Ward, Scott Woodbury of Shaw Nature Reserve, and John Alberici tour Alberici headquarters in St. Louis. A diversified construction company, Alberici has made sustainability and conservation a priority by incorporating native plants, stormwater retention, and prairie vegetation throughout the site.

grounds managers are learning about their long-term maintenance needs. Everyone is becoming more aware of the benefits of community conservation practices."

As more architects, engineers, and city governments realize there's a need for nature in urban development, MDC staff has played increasingly important roles in communities around the state.

"Planning, design, and development professionals, many of whom were educated out of state, benefit from technical assistance offered by the Missouri Department of Conservation," Burnett said. "They come to us to better understand local wildlife, which native plants will provide the functions needed for green infrastructure systems to work as intended, and how people benefit from nature. Department staff are able to provide site-specific information about natural resources that help make the integration of nature into cities a successful endeavor."

Some of community conservation's benefits don't show up as figures on a spreadsheet or numbers on a construction budget, but they're just as important.

"Community conservation also provides health benefits," said Carrie Lamb, the water quality coordinator for the City of Springfield. "I think most people would agree that it is more pleasant to walk down a tree-lined street than one with no trees. More and more studies show that trees, views of nature, and access to nature in our daily lives reduce stress and crime, provide a better work environment, and even help people heal faster from illness."

And, of course, community conservation efforts provide habitat benefits.

"Even though urban wildlife habitats tend to be relatively small, they still contribute to natural diversity and provide considerable wildlife benefit," said Josh Ward, MDC community conservation planner in St. Louis. "For example,



Learn More About Building With Nature

MDC employs three community conservationists in urban areas around the state. They can help civic leaders and planners use green infrastructure to solve problems, save money, and improve life for people and nature.

- ➔ In Springfield, call Ronda Burnett at 417-836-8407.
- ➔ In St. Louis, call Josh Ward at 314-301-1506, ext. 4213.
- ➔ In Kansas City, call Stephen Van Rhein at 816-759-7305, ext. 1128.

For information about community grants, responsible construction, and other urban land-management topics, visit MDC's *Your Property* webpage at mdc.mo.gov/property.

researchers are finding that native bee abundance and diversity in urban areas like St. Louis is comparable to that of other high-quality Missouri habitats.

"Think of it as providing habitat for wildlife and people," Ward continued. "Improving wildlife habitat is the main component, but community conservation is also about people. A benefit of providing public access to urban wildlife habitat is to provide educational opportunities to a larger audience."

Slower, Safer, Cooler Flows

An example of the benefits habitat can provide in an urban setting can be found in the City of Columbia's Median and Roundabout Native Habitat Project. In an effort to create more productive green spaces, the Columbia Public Works Department, Office of Neighborhood Services, and the Sustainability Office have partnered to design and implement native plantings at selected medians and roundabouts across the city. In addition to providing habitat for butterflies and other pollinating insects, these medians will better serve people, too. Studies have shown that these types of areas

vegetated with native plants tend to slow the traffic, which makes the area safer, and they also increase the property values of neighboring buildings. Native plantings also reduce drivers' fatigue, anger, and stress. On top of that, maintenance costs are reduced because they don't have to be mowed.

An MDC-assisted refurbishing of Springfield's Government Plaza, completed in 2015, is an example of how construction and conservation can go hand in hand. When the complex's parking lots were built decades earlier, the design was typical of that era's prevailing function of paved areas — to move water off the site as quickly as possible. However, the problems associated with fast water runoff provided clear signs there had to be a better way to build a parking lot. In particular, flooding washes pollutants into nearby streams. In hot weather, rainwater warmed by hot pavement flows into streams, killing fish, and degrading habitat. The reconstruction of the parking areas featured pervious pavement, rain gardens, and bioswales planted with natives. Together, these

features capture a portion of the rainfall through infiltration. This reduces the runoff volume and associated pollution into nearby Jordan Creek, a stream that carries water through the center of the city into Wilson's Creek, then into the James River and, ultimately, into Table Rock Lake. The project will also feature signage to help educate the public and professionals who visit the city offices to procure permits for construction and development projects.

Science and Economics

Besides adhering to smart biological principles, incorporating conservation practices into the design of streets, buildings, and business districts is making good use of another science architects and engineers rely on — physics.

"Let's take water, for instance," Burnett says. "The rougher the surface that runoff flows over, the slower it will travel. This is due to the coefficient of the friction provided by the surface. Gravel has a higher coefficient of friction than concrete, and tall native vegetation has a higher coefficient of friction than mowed grass."

Lamb said that conservation-friendly construction was once viewed as having a higher price tag, but that perception is changing.

"It may not be true for every site, but there are more and more examples and studies showing that LID methods can actually be cheaper than conventional development practices," Lamb said. "If the environmental costs were factored in, that would definitely make LID a more cost-effective option. There are economic tools available to architects and designers that can be used to measure the environmental costs and benefits to help make a true comparison."

When it comes to community conservation, the best economic tool a developer can use is advanced planning.

"The environmentally friendly method of site development often requires more preconstruction planning for something like a heavily treed piece of property," said MDC Community Forester Cindy Garner. "But if the planning process involves the saving of trees from the very beginning — just



Community conservation efforts can provide educational benefits for schools. Danielle Fox (above, center) serves as Columbia's community conservationist, a cooperative position with the Missouri Department of Conservation. She works with groups like the Columbia Center for Urban Agriculture to create outdoor classrooms that connect students to natural systems.

as, say, the planning of a utility hookup to a site is something that's considered from the outset — then these methods (conservation-friendly development) can occur just as easily and inexpensively. Decisions made on paper will always be cheaper than when the equipment is moving."

Connecting Citizens to Nature

Spreading the conservation message to citizens is an important part of community conservation. Whether it's a mural about trees in downtown Springfield or a sign promoting native-plant landscapes in Columbia, it's important that urban

conservation efforts deliver a take-home message.

"Education and outreach is an important part of community conservation," Ward said. "Many of our projects include an interpretive sign to help the public understand what we are doing and why we are doing it. We hope that these efforts are helping us inform and educate people to promote conservation stewardship now and into the future."

"Community conservation is all about people and their needs," said Jason Jenson, MDC Private Land Services Chief for the Ozarks. "After understanding the needs of citizens in our urban areas, we find ways to meet those needs by applying conservation practices. Connecting Missouri's citizens to

nature helps meet social, economic, and environmental needs."

Habitat stewardship and economic benefits are key components of community conservation, but perhaps the practice's most important take-away message for professionals and citizens is connectivity.

"Community conservation matters because it affects our quality of life," Lamb said. "Humans are a part of, and not separate from, the environment." ▲

Francis Skalicky is the media specialist for the Missouri Department of Conservation's Southwest Region. He lives in Springfield and tries to enjoy the outdoors with his family as much as possible.

LOBSTERS


OF THE MIDWEST



A large pile of cooked crayfish, showing their characteristic orange-red color and long antennae, is served on a blue plate with white speckles. The plate is resting on a rustic wooden surface. The background is a solid blue color.

MISSOURI'S BIGGEST CRAYFISH IS TABLE WORTHY

by Bill Graham | photographs by Noppadol Paothong

A large crayfish with a greenish-brown body and long, segmented antennae is shown on a bed of light-colored rocks. The crayfish is facing towards the right of the frame.

They're big, bold, and mostly unseen except to devoted followers of an Ozark dining delicacy.

Meet the longpincered crayfish.

What enables them to rule a watery world — their massive size — also makes them tasty table fare.

A Size Above the Rest

On a summer night, shine a flashlight down into Table Rock Lake's shallow water and you may be startled by lobster-looking crayfish scurrying among the rocks. Many a youngster and grownup has turned over stones in a stream and carefully grabbed a 2- or 3-inch-long "crawdada" behind the head to avoid the pincers. So, in comparison, imagine seeing the longpincered crayfish that can be 6 inches long from tail to snout, plus its 3-inch pincers.

"I think they're great," said Bob DiStefano, an MDC resource scientist who has studied longpincered crayfish.

The crustacean that science knows as *Faxonius longidigitus* is Missouri's largest crayfish and one of the nation's largest. It is found only in streams in the White River basin and lakes such as Table Rock and Bull Shoals. Its long, slender pincers are bluish-green with yellowish knobs. The abdomen and carapace are olive tan with bright red spots.

"They're a very cool species," DiStefano said. "They're pretty, they're large, and they're a little bit cantankerous. And they taste great."

Trapped and Studied

MDC researchers have trapped crayfish for studies, and DiStefano has spent hours scuba diving in Table Rock Lake to watch them. Most crayfish are active only at night to avoid sight-feeding predators. But he watched longpincered crayfish active in the daylight hours looking for food on the bottom where they live among the lake bed's chunk rock.

"It made me think of them as the biggest, baddest dog on the block," he said.

Studies showed crayfish avoid water with poor dissolved oxygen levels, DiStefano said. Researchers trapping crayfish found a higher abundance in shallow waters.

Longpincered crayfish were identified as a species and given a scientific name in 1898 by Walter Faxon, a bird and crayfish expert from Harvard University. Native Americans and pioneer settlers may have simply referred to them as the big ones that are good to eat once boiled and spiced. How common they were in the White River system and what changes lake construction brought in the 20th century is unknown. Lakes, however, certainly gave them more room to roam. MDC researchers trapping crayfish at Table Rock Lake found them more abundant in shallow waters if water temperatures and dissolved oxygen levels were favorable.



Longpincered crayfish



Longpincered crayfish are only found in streams in the White River basin, plus lakes such as Table Rock and Bull Shoals.

“We did better in gently sloping coves than off steeply sloping ledges,” DiStefano said.

The average size of longpincered crayfish collected from lakes was larger than those collected from rivers, he said. Perhaps food is more abundant in lakes, and maybe less predator pressure lets some grow longer and thus larger.

Longpincered crayfish can filter microorganisms from the water with their gills, grab fish or snails with their pincers, gnaw on dead fish or leaves, suck up algae, or perhaps even prey on other crayfish.

“Crayfish eat everything, and everything eats crayfish,” biologists say of their important role in ecology.

Fine Dining

Everything that eats crayfish includes people. Like lobsters, most crayfish are cooked by dropping them live in boiling water with spices. Twist the tail meat open and you have a bite that’s like shrimp or lobster. Some people also tear the tail off and suck the juices out of the thorax, “the tamale,” says MDC Education Specialist James Worley. He claims it has a liver-like flavor. Most Missouri crayfish can be cooked and the tail meat eaten,

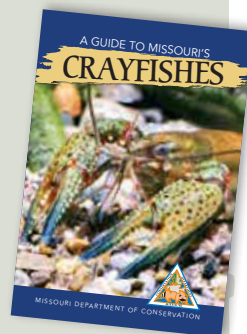
Crayfish: Variety in Missouri’s Waterways

You want variety? Check out Missouri’s 36 species of crayfish. These crustaceans help clean our waterways by eating dead things and serve as a key food source for fish and other predators. They come in assorted sizes and colors and their quintessential pincers come in different shapes. For example, the Neosho midget crayfish only tops out at 2 inches long but has broad, powerful pincers, while the longpincered crayfish has slender 3-inch pincers. Some crayfish blend into their surroundings with camouflage color patterns, while the red swamp crawfish is dark red. Eight species are unique to Missouri and another dozen only share limited ranges in other states.

Crayfish have sci-fi movie-worthy bodies with walking legs, front legs with little pincers, protruding eyes, long antennae, and muscular tails with fans that can flip them quickly from one spot to another. Some species only live in specialized habitats, such as caves or mud burrows. Others prefer ponds, lakes, or rivers with specific water qualities. They’re part of both prairie and forest ecology.

Some crayfish species, however, are rare in Missouri due to a limited range or threats from pollution or invasive species. Twenty-one species are of conservation concern. **Don’t dump or move live crayfish** — it is illegal to transport and release crayfish into another water body. That regulation protects native crayfish species from being displaced by invaders.

MDC offers a free publication, *A Guide to Missouri’s Crayfishes*, with tips on crayfish conservation and ecology, and color photographs of common or interesting species. To request a copy, call 573-522-0108 or email pubstaff@mdc.mo.gov.



For more on Missouri crayfish, visit short.mdc.mo.gov/ZTt.

though they can be small morsels and taste can vary. But a longpincered tail provides a big bite.

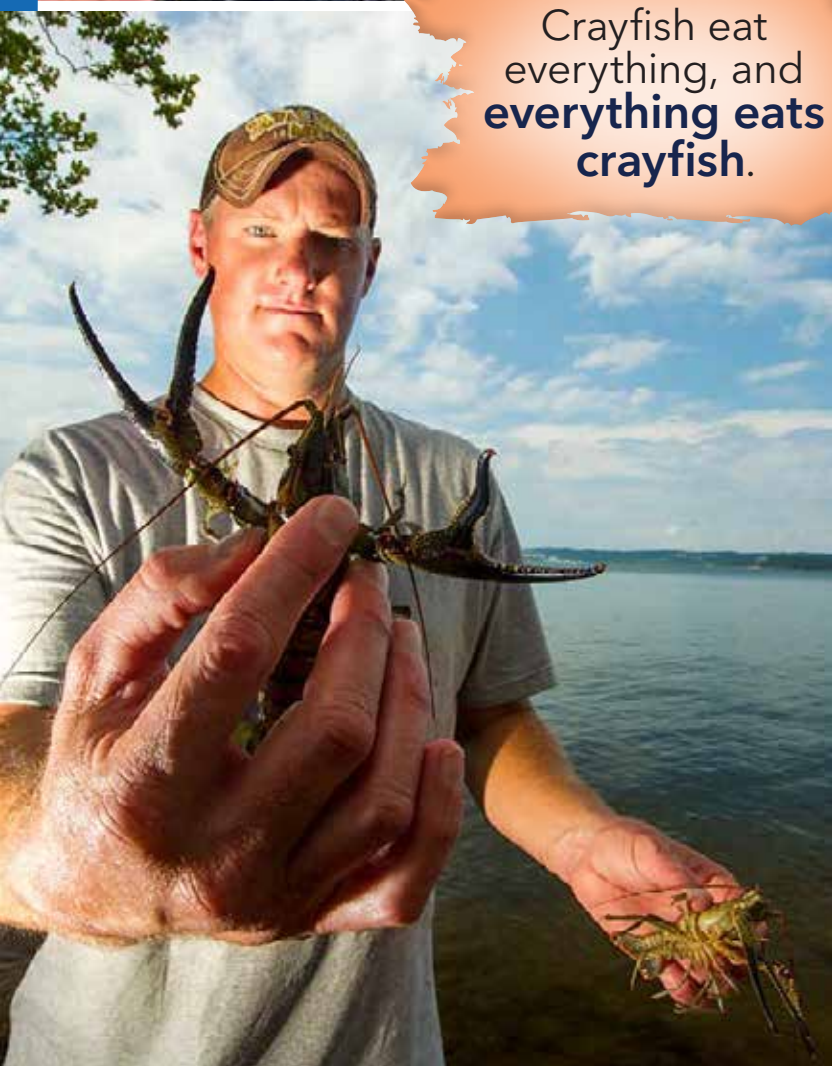
“They’re big enough that you can bust open the pincers and get a little piece of meat, too,” said Scott Crain, a Branson-area native and assistant manager at MDC’s Shepherd of the Hills Fish Hatchery, who traps and cooks longpincered crayfish at Table Rock Lake. “That’s kind of a delicacy, eating that pincer meat.”

Crain’s family camps at Table Rock Lake, sets traps for longpincered crayfish, and dines on boiled crawfish they catch. Other Missouri families also trap them, as longpincered crayfish have a small but loyal regional following.

Crayfish are attracted into wire traps by bait producing scent, such as dead fish. This trapper drilled holes in plastic film containers (below) and filled them with dog food. Commercial or homemade wire mesh traps (right) have conical openings that are easy for crayfish to enter. Hold carefully (bottom), because guess how longpincer got its name?



Crayfish eat everything, and everything eats crayfish.



Longpincer crayfish as dining fare does not have a national reputation like the famous Cajun crayfish traditions from Louisiana. Crayfish cooking is also widely popular in the Pacific Northwest, DiStefano said. Scandinavian countries have centuries-old crayfish eating traditions and immigrants brought them to Wisconsin and a few other states.

Visitors from such places are often surprised by longpincer crayfish on display in aquariums at MDC's Shepherd of the Hills Conservation Center near Table Rock Lake dam at Branson.

"We get people from Louisiana, and they get really excited when we show them we have crayfish in the lake this big," said Leah Eden, the center's naturalist. "The most common comment is that they resemble a lobster because they're so big."

To Catch a Longpincer Crayfish

Before you can cook and eat crayfish, you have to catch them, and to do so you must possess a valid fishing license. Some people wade in rivers or the lakes and grab them by hand. Jay Heselton of Nixa likes to take his grandkids to the Finley River, a White River tributary, and catch longpincer crayfish while wading in the river.

"I like to go one on one with them," Heselton said.

But most people who catch enough longpincer crayfish to make a meal or to feed a group, trap them at Table Rock Lake. Most use wire mesh traps with bait inside, either homemade traps or those purchased from outdoor gear dealers. The trap entrance cannot be larger than 1.5 inches wide by 18 inches long, and the owner's name and address must be attached. Conical openings allow crayfish to easily enter traps but make it hard for them to get out. They remain alive until cooked.

Since crayfish are scavengers and will follow scent to food, traps are often baited with dead nongame fish, raw chicken necks, or an open can of dog or cat food. Crayfish are more active at night, so traps are usually set by day, left overnight, and checked the next day. A trapper who leaves a dead fish in a crayfish trap may return the next day to find fed crayfish and the skeleton of a fish cleaned down to bare bone.

Traps are placed on the lake bottom. Often at Table Rock, they are tied onto boat docks. But Crain also uses floats to mark and retrieve traps. The limit is 150 crayfish per angler per day.

"We typically leave traps 24 hours before we run and retrieve," Crain said. "I'll have two or three traps in 12 feet of water, two or three down 20 feet, and a couple in between. When you run them, you'll have a couple of traps that won't have very many crayfish in them and some with 12 or 15."

Crain notes locations on the lake at night where lights reveal them darting about on the bottom.

"You see them everywhere at night," he said. "Their little eyes shine like diamonds in the light."



Boil, peel, and bite — longpincer crayfish tails are tasty, similar to shrimp. Spices in the boil help determine flavor. Scott Crain also cracks open the pincers for meat from Missouri's largest crayfish.

How to Prepare Longpincer Crayfish

Crain prefers to cook 35 or 40 longpincer crayfish to make a meal for one or two people. However, 75 or 80 crayfish make a better mess when the whole family is at the table. His family often collects crayfish for several days, putting them in a plastic kiddie swimming pool with salted tap water. This purges the crayfishes' digestive system to provide cleaner taste. Some people do the purge in coolers or some type of aerated container. It's important to keep the crayfish alive.

Crain brings water in a pot to a boil and cooks corn on the cob and potatoes for about 20 minutes. Then he puts the crayfish in for 4 to 5 minutes. The commercial crab boil seasonings, sold in local grocery stores, work fine for cooking crayfish. Seasonings help dictate flavor.

"Some people have a little melted butter with garlic on the side to dip them in," he said.

Like a Louisiana crayfish boil, the cooks often spread some paper on a table and dump the crayfish, potatoes, and corn out in a pile. Diners dig in. Crain likes to have small forks and a tool to crack the pincers open.

"It's a lot of fun," he said.

Longpincer crayfish are one of nature's miracles. They are a unique species, evolved over millions of years, and capable of growing twice as large as the next biggest Missouri crayfish. They are an underutilized fishery available to outdoor enthusiasts, especially in the lakes, DiStefano said.

"I have no qualms whatsoever that the population could withstand greater harvest and not be affected," he said. Among their many talents, "crayfish are very prolific breeders as long as we maintain good water quality and habitat." ▲

Bill Graham is a lifelong Missouri outdoorsman and an MDC media specialist who lives in Platte County.

Hot or Cold, Crayfish is a Delight

Missouri's crayfish, also called crawdads or mud bugs, can be cooked and served in a variety of ways, hot or cold. But some preparation steps are common to all dishes.

Use only live, freshly caught crayfish. Some cooks keep them in a container of clean water, or perhaps lightly salted water, prior to cooking for a few days to purge their intestinal system. Keep cooked crayfish chilled until used. The tail meat is what is used in most recipes. Even Missouri's smaller crayfish can provide a tasty tail meat bite if prepared well.

A simple way to cook crayfish is dropping them into boiling water along with a crab boil seasoning mix. Peel the tail meat out of the shell and eat them like shrimp.

However, there's more than one way to enliven your crawdad dining. Tail meat can be added to spicy Cajun recipes, mixed in salads, added to a rice pilaf, sealed in a pastry, spiced to personal tastes, or frozen for a future hors d'oeuvre serving.

For crayfish etouffee, saute three large onions finely chopped in one stick of butter. Add crayfish fat from the body cavity and cook over low heat until the fat comes to the top. Add tail meat and season to taste. Mix in enough hot water to bring the etouffee to desired consistency, and simmer for 20 minutes. Add parsley and serve over steaming hot rice. Serves 5 to 6.

Scandinavian countries have a long crayfish cooking tradition. Author Bernadette Dryden provided a simple Swedish-style boiled crayfish (kokta kräftor) recipe in her MDC cookbook, *Cooking Wild in Missouri*. She obtained the recipe from Gunilla Murphy, a native of Sweden and the wife of Missouri Conservation Commissioner Dave Murphy.

Bring 2¾ quarts of water, ½ cup of salt, and lots of fresh dill crowns to a boil. Add 2 pounds (about 25) of fresh, live crayfish. Cook for 10 to 12 minutes after the water returns to a boil. Let the crayfish cool in the liquid. The crayfish can also be frozen in the liquid, and when ready to eat, defrost and serve very cold.

You'll find more crayfish recipes at short.mdc.mo.gov/Z3U.

Get Outside

in APRIL →

Ways to connect
with nature



Beautiful Blooms

Enjoy the white flowers of the state's official tree, the **flowering dogwood**, blooming across the landscape.



Keep the Lights On

Look for **luna moths** around porch lights.

Who's Calling?

The springtime months bring a symphony of sounds. Two sounds to listen for this month are the high-pitched trill of the American toad and the gobble of the **wild turkey**.



KANSAS CITY REGION

Paddlefish Snagging Clinic

Saturday, April 14 • 8 a.m.-1 p.m. and 10 a.m.-3 p.m.

Warsaw Community Building

181 W. Harrison St., Warsaw, MO 65355

Registration required, call 660-530-5500

Limit 24 participants per session

Participants will hear about paddlefish conservation efforts, and learn techniques for snagging and cleaning paddlefish. The clinic includes a two-hour snagging session. Lunch is provided.

Natural Events to See This Month

Here's what's going on
in the natural world.



Black
bears
emerge
from
winter
dens



Copperheads
leave winter
dens



Canada
goose
goslings
begin
hatching

SOUTHEAST REGION

A Southeast Earth Day

Saturday, April 21 • 1-4 p.m.

Cape Girardeau Conservation Nature Center
2289 County Park Drive, Cape Girardeau, MO 63701
No registration required; call 573-290-5218 for information
All ages

Come celebrate Earth Day as we focus on the amazing plants, animals, and habitats Missouri has to offer. Walk the trail to answer trivia questions or to just enjoy a nice spring day. Stop by the classroom to take part in an Earth Day craft or head to the bird-viewing area to relax. There's something for everyone at the nature center.



American robins

Home Sweet Home

Robins and other backyard birds are building nests. Give them a hand by making your yard their headquarters for nesting supplies like sticks, mud, grass clippings, and even pet hair.



Ruby-throated hummingbirds arrive



Columbine blooms

Morel Mania

Morel mushrooms, Missouri's most popular edible mushroom, are popping up in wooded areas across the state. Get out there and get hunting! It takes a sharp eye — morels are notoriously hard to locate, camouflaged against the forest floor.



Morel mushroom

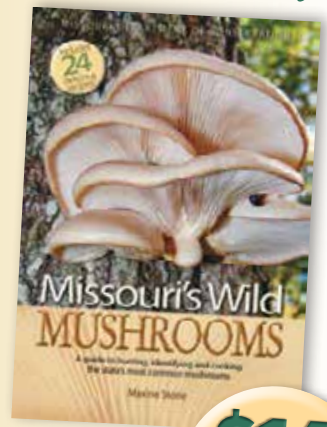


Mushroom identification is key

Tag along with an experienced morel hunter or take a good reference book along on your hunt.

MISSOURI'S WILD MUSHROOMS

is an informative guide to the common fungi of the state. Available at nature centers and mdcnatureshop.com.



If you have any doubt about a mushroom, don't keep it. For tips on mushroom hunting visit mdc.mo.gov/mushroom-hunting.

\$14

plus shipping, handling, and tax

Places to Go

NORTHWEST REGION

Pawnee Prairie Natural Area

Where prairie-chickens dance in northwest Missouri

by Larry Archer

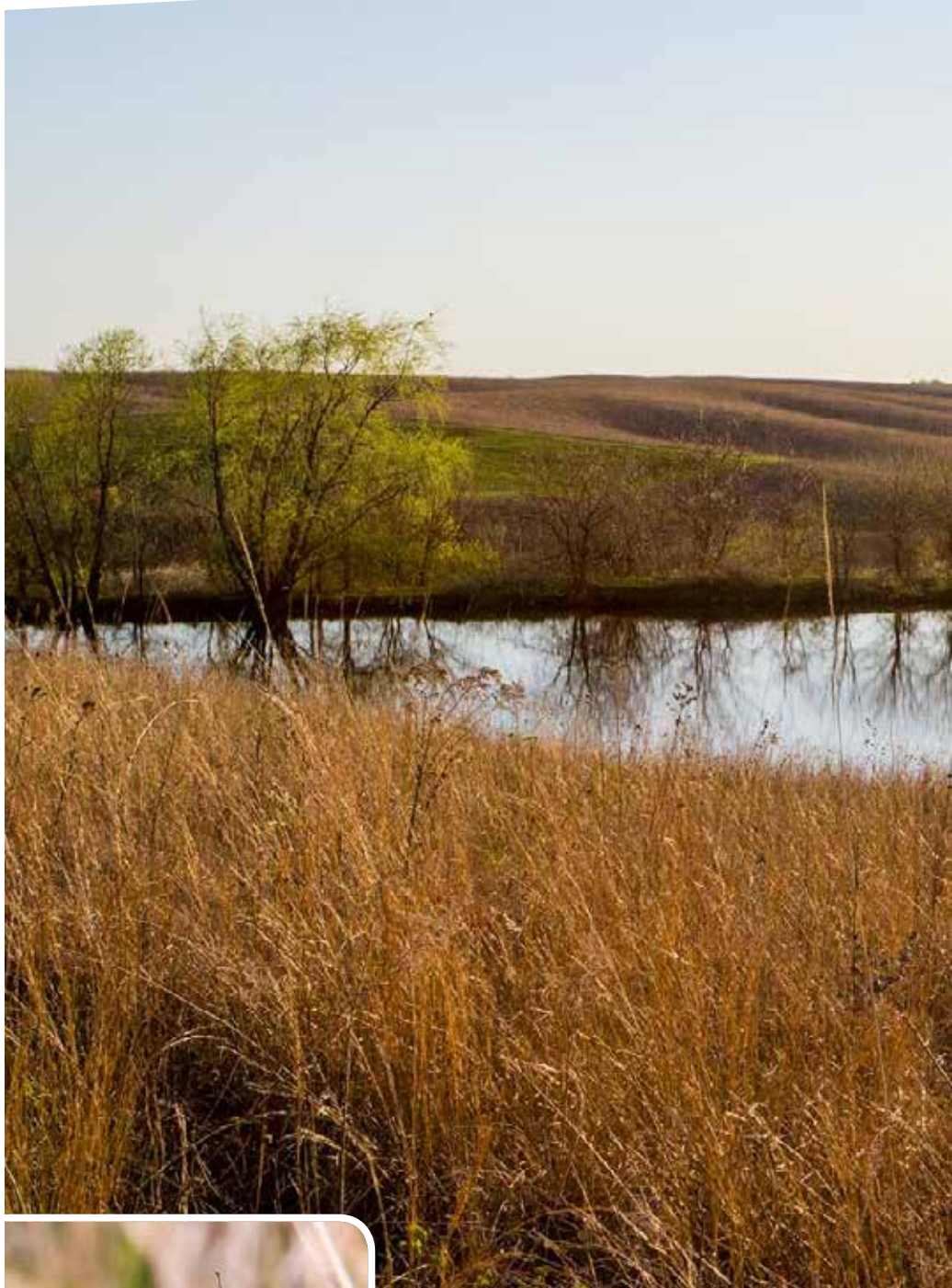
✱ **An island of native grasslands** surrounded by a sea of crop and pastureland in northwest Missouri, Pawnee Prairie Natural Area serves as a crossroads for migrating birds, and in April, keen-eyed birders can catch them coming and going.

But even with a buffet of grassland species and returning Neotropical migrants, it's a single species that draws most birders to the 476-acre natural area in Harrison County, said Wildlife Management Biologist Jesse Kamps, Pawnee Prairie's manager.

"In April, I'd say pretty much the only thing you're going to see anybody out there doing would be bird-watching," he said. "And they're probably hoping to see prairie-chickens."

An icon of the area's open-prairie past, the male prairie-chicken's elaborate mating dance is a sight many are willing to spend chilly, motionless pre-dawn hours to see. While occasional visitors to Pawnee Prairie, any prairie-chickens seen there are likely spillovers from the nearby — and much larger — Dunn Ranch Prairie, which is owned by The Nature Conservancy.

"Dunn Ranch generally has the brunt of the groups of birds displaying there, but some of the outlying areas, some of the private ranches around there, will also have birds displaying," Kamps said. "Pawnee can have birds displaying."



This pond, one of several at Pawnee Prairie NA, was installed by previous landowners to water grazing livestock. It now waters wildlife, serves as a stopover for migrating waterfowl, and provides a home for brood stock of Topeka shiners, an endangered species that is being reintroduced into a stream that passes through the area. Left: Warmer spring temperatures bring out increased numbers of butterflies, including this black swallowtail.



PAWNEE PRAIRIE NATURAL AREA

consists of 476 acres in Harrison County.
From Hatfield, take W. 140 Ave. south
one-half mile.

N40° 31' 3.72" | W94° 9' 19.8"

short.mdc.mo.gov/ZZC 660-726-3746

WHAT TO DO WHEN YOU VISIT



Bird-Watching Included in the Great Missouri Birding Trail and in the National Audubon Society's Grand River Grasslands Important Bird Area. The eBird list of birds recorded at Pawnee Prairie NA is available at short.mdc.mo.gov/ZTK.



Hunting Deer

Deer hunting regulations are subject to annual changes, so refer to the *Fall Deer and Turkey Hunting Regulations and Information* booklet for current regulations.

"Early in April, we're still having some birds that had come down for the winter, so you might be seeing **short-eared owls, harriers, or kestrels**. In late April, you might start to see some of the Neotropical migrants or some of the migrants that only go to the southeast, like **Henslow's sparrows** or **grasshopper sparrows**."

—Pawnee Prairie Natural Area
Manager Jesse Kamps

WHAT
TO
LOOK
FOR
WHEN
YOU
VISIT



Greater prairie-chicken



American badger



Eastern meadowlark



White-tailed deer

Wild Guide



Paddlefish

Polyodon spathula

Status

Highest in impoundments

Size

Length: to about 7 feet
Weight: to 160 pounds or more

Distribution

Historically found in the Mississippi, Missouri, and Osage rivers, and other streams; now stocked in impoundments



Did You Know?

Paddlefish is Missouri's official state aquatic animal. It is highly valued as a sport fish — both for its flesh and its caviar.

Sharklike, with a greatly elongated paddle-shaped snout, paddlefish — also known as spoonbill — is one of the most ancestral fish species alive today. River modifications, especially channelization, damming, and impoundments, have diminished the paddlefish's habitat, and overharvesting has contributed to its decline. In fact, the species' closest relative, the Chinese paddlefish, recently became extinct. The species is of great importance to biological research.

LIFE CYCLE

Spawning occurs in late spring at times of high water. Eggs are deposited on silt-free gravel bars where they are exposed to air or covered by shallow water. The eggs hatch and the larval fish are swept downstream to deeper pools where they grow to adulthood. Paddlefish can attain a length of 10 to 14 inches their first year, and by age 17, can be 60 inches long. Paddlefish can live to be 30 years old or more

FOODS

Paddlefish swim slowly with their mouths wide open, collecting tiny crustaceans and insects in their elaborate, closely set gill rakers.

ECOSYSTEM CONNECTIONS

Paddlefish constantly graze on tiny aquatic organisms, helping to keep their populations in check. Paddlefish and their eggs and fry provide food for other aquatic predators.

TOP: JIM RATHER; INSET: CRAIG GEMMING

Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖

FISHING

Black Bass

Impounded waters and non-Ozark streams:
Open all year

Bullfrogs, Green Frogs

June 30 at sunset-Oct. 31, 2018

Nongame Fish Giggling

Impounded Waters, sunrise to sunset:
Feb. 1-Sept. 14, 2018

Paddlefish

Statewide:
March 15-April 30, 2018

On the Mississippi River:

March 15-May 15, 2018
Sept. 15-Dec. 15, 2018

Trout Parks

Catch-and-Keep:
March 1-Oct. 31, 2018

Spring Turkey Season

Spring turkey hunting youth weekend is April 7 and 8, with the regular spring season running April 16 through May 6. Find detailed information in the *2018 Spring Turkey Hunting Regulations and Information* booklet, available where permits are sold and online at short.mdc.mo.gov/ZZf.



Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you buy permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at short.mdc.mo.gov/Zi2.

HUNTING

Bullfrogs, Green Frogs

June 30 at sunset-Oct. 31, 2018

Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

Crow

Nov. 1, 2018-March 3, 2019

Deer

Archery:

Sept. 15-Nov. 9, 2018
Nov. 21, 2018-Jan. 15, 2019

Firearms:

- ▶ Early Youth Portion (ages 6-15):
Oct. 27-28, 2018
- ▶ November Portion:
Nov. 10-20, 2018
- ▶ Late Youth Portion (ages 6-15):
Nov. 23-25, 2018
- ▶ Antlerless Portion (open areas only):
Nov. 30-Dec. 2, 2018
- ▶ Alternative Methods Portion:
Dec. 22, 2018-Jan. 1, 2019

Groundhog (woodchuck)

May 7-Dec. 15, 2018

Pheasant

Youth (ages 6-15):
Oct. 27-Oct. 28, 2018

Regular:

Nov. 1, 2018-Jan. 15, 2019

Quail

Youth (ages 6-15):
Oct. 27-Oct. 28, 2018

Regular:

Nov. 1, 2018-Jan. 15, 2019

Rabbit

Oct. 1, 2018-Feb. 15, 2019

Squirrel

May 26, 2018-Feb. 15, 2019

Turkey

Archery:

Sept. 15-Nov. 9, 2018
Nov. 21, 2018-Jan. 15, 2019

Firearms:

- ▶ Youth (ages 6-15): April 7-8, 2018
- ▶ Spring: April 16-May 6, 2018
- ▶ Fall: Oct. 1-31, 2018

Waterfowl

See the Waterfowl Hunting Digest or visit short.mdc.mo.gov/ZZx for more information.



ILLUSTRATION: MARK RATHIEL

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at short.mdc.mo.gov/Zib. Current hunting, trapping, and fishing regulation booklets are available from local permit vendors or online at short.mdc.mo.gov/ZZf.



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on Instagram**

@moconservation

The recipe for a perfect spring day — warm sunshine, budding dogwood trees, and the lavender blooms of wild sweet William at Rocky Creek Conservation Area in Shannon County. Similar recipes await you at any of MDC's more than 1 million acres of conservation land. Discover your recipe at mdc.mo.gov/atlas.

📷 by **David Stonner**

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